2015 Biannual Recertification

WXJC Nighttime Facility

Birmingham, Alabama

02-09-2015

Radio Station WXJC, Birmingham operates at 50KW nominal day, 1KW nominal night. The night pattern is licensed pursuant to the moment method modeling provisions of 47 C.F.R. §73.151(c). The license for the modeled nighttime facilities was granted on September 17, 2010.

The sampling system consists of 5 identical sample loops mounted 37.277 meters above the base insulator. Each sample line runs from the loop, through a parallel-resonant isocoil, and finally, through a buried line into the transmitter building. As per standard engineering practice and the Rules, the following measurements were taken from the input connectors at the back of the Potomac Instruments 1901 antenna monitor to (and through) the connected sample loops.

An Array Solutions PowerAIM 120 analyzer was used on 02-09-15 to obtain these values:

	Tower 1	Tower 2	Tower 3	Tower 4	Tower 5	Units
R at 850 KHz	5.96256	5.973	6.13	5.841	6.334	Ohms
X at 850 KHz	-28.232	-28.445	-28.967	-28.776	-28.836	Ohms
Z at 850 KHz	28.854773362	29.065353155	29.608512104	29.362824404	29.523455963	Ohms
Mean Z at 850	29.282983797					Ohms
Deviation	-0.428210436	-0.217630643	0.3255283063	0.0798406069	0.2404721655	Ohms
Low 0 Freq	692.965	692.965	692.965	692.965	692.965	KHz
High 0 Freq	922.1	922.1	924.121	922.111	924.111	KHz
Low (-45) Freq	830.8	830.8	830.8	830.8	830.8	KHz
R @ -45	8.5	8.5	8.5	8.4	8.2	Ohms
X @ -45	49.38	49.32	49.6	49.38	48.65	Ohms
Calculated Z	50.106231149	50.047101814	50.323056346	50.089364141	49.336218947	Ohms
High (+45) Freq	1015.4	1015.4	1015.4	1015.4	1015.4	KHz
R @ +45	9.2	9.2	9.2	9.1	9.3	Ohms
X @ +45	49.92	49.63	50.58	49.82	50.65	Ohms
Calculated Z	50.760677694	50.475507922	51.409886209	50.644273121	51.496723197	Ohms
Characteristic Z	50.433454422	50.261304868	50.866471277	50.366818631	50.416471072	Ohms

Shaded items are calculated; the unshaded values are those taken by measurement. All measurements were made at the sample line connection points to the Potomac Instruments 1901 antenna monitor in the transmitter building. The cells labeled “Z at 850 Khz” are the measured impedances at the operating frequency. The “Deviation” cells are the calculated deviation from the mean.

The second group of measurements and calculations (the remainder of the spreadsheet) demonstrate that the characteristic impedances of each sample line are in compliance with the Rules. Using the analyzer, we first determined the zero-impedance frequencies of each line, with the sample loops attached.

We chose the "High 0 Freq(uency)" as being the closest to the carrier frequency (850 KHz), then derived the + and - 45 degree frequencies from that (the "Low (-45) Freq" and "High (+45) Freq" values). The final row, showing the Characteristic Impedance, was calculated with the standard formula,

$$Z_O = ((R_1^2 + X_1^2)^{1/2} \times (R_2^2 + X_2^2)^{1/2})^{1/2}$$

We thus conclude that the WXJC sampling systems meets the requirements of the Rules.

The final step was to check the field strength at several sample points on various radials, as detailed on the last page. The antenna monitor readings were confirmed to be within 1% ratio and .5 degree phase of the licensed values.

The 95 and 195 degree radials are the maxima ("lobes") and the remainder are minima ("nulls"). We continue to have problems with man-made interference and with re-radiation.

We conclude that the nighttime modeled array for WXJC continues to satisfy the FCC's Rules and Regulations for same.

Stephen M. Poole, Chief Engineer

February 9, 2015

Field Strength Measurements

°T	Dist, KM	Nearest Address, Zipcode	N Lat	W Long	mV	Date	mV	Date
22	3.11	651 Carson Road, 35217	33 39 01	86 44 04	39	04/20/15	39	02/04/15
22	4.70	5424 Red Hollow Rd, 35215	33 39 49	86 43 40	14	04/20/15	14	02/04/15
22	9.53	100' N of Turkey Creek WTP	33 42 13	86 42 28	2.6	04/20/15	2.6	02/04/15
26	3.97	5221 Red Hollow Rd, 35215	33 29 23	86 43 40	9	04/20/15	9	02/04/15
26	5.79	5674 Red Hollow Rd, 35215	33 40 16	86 43 10	12	04/20/15	12	02/04/15
26	8.91	≈.3 mi S of Turkey Creek WTP	33 41 47	86 42 16	4.1	04/20/15	4.1	02/04/15
50	3.48	1326 Sunhill Rd NW, 35215	33 38 41	86 43 07	8.8	04/20/15	8.8	02/04/15
50	5.10	691 26th Ave NW 35215	33 39 14	86 42 17	2.1	04/20/15	2.1	02/04/15
50	8.86	3192 Cobblestone Dr, 35215	33 40 31	86 40 24	.64	04/20/15	.64	02/04/15
95	3.88	721 Carson Road, 35215	33 37 18	86 42 19	28.5	04/20/15	28.5	02/04/15
95	5.46	1305 Huffman Rd, 35215	33 37 13	86 41 18	11.2	04/20/15	11.2	02/04/15
95	7.06	1366 Springville Rd, 35215	33 37 07	86 40 16	.98	04/20/15	.98	02/04/15
139	3.77	505 Lawson Rd, 35217	33 35 56	86 43 13	4.9	04/20/15	4.9	02/04/15
139	4.76	59 Roebuck Drive, 35215	33 35 32	86 42 48	3.5	04/20/15	3.5	02/04/15
139	5.87	9059 Parkway East, 35206	33 35 05	86 42 19	2.2	04/20/15	2.2	02/04/15
195	3.44	2487 Valley View Dr, 35217	33 35 40	86 45 24	74	04/20/15	74	02/04/15
195	4.71	1499 Bethel Ave, 35217	33 35 01	86 45 37	48	04/20/15	48	02/04/15
195	6.43	4764 Inglenook Ln, 35217	33 34 07	86 45 54	42	04/20/15	42	02/04/15
261	4.03	1825 Carson Rd, 35217	33 32 07	86 47 24	1.9	04/20/15	1.9	02/04/15
261	6.72	2028 Hickory Ln, 35068	33 36 54	86 49 08	1.3	04/21/15	1.3	02/05/15
261	9.84	3525 Shady Grove Rd, 35068	33 36 37	86 51 07	.13?	04/21/15	.13	02/05/15
299	3.32	New Castle Rd, ≈ .16 mi W	33 38 19	86 46 43	3.0	04/21/15	3.0	02/05/15
		of Cypress Street				04/21/15		02/05/15
299	6.64	102 Gardendale Dr, 35071	33 39 12	86 48 36	.69	04/21/15	.69	02/05/15
299	9.40	5391 Brewer Rd, 35071	33 39 56	86 50 09	.46	04/21/15	.46	02/05/15
336	2.21	1324 Carson Rd, 35217	33 38 33	86 45 24	5.2	04/21/15	5.2	02/05/15
336	3.60	4268 New Castle Rd, 35071	33 39 15	86 45 46	2.25	04/21/15	2.25	02/05/15
336	14.5	8211 Miller Pl, 35116	33 44 35	86 48 40	.085?	04/21/15	.085	02/05/15

? - severe interference

Possible re-radiation on the 195 vector. :(